AVIATION

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The Norge Leaving Spitzbergen for Alaska, Via the North Pole

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VOLUME XX

NUMBER 23

SPECIAL FEATURES

NAVAL AVIATION

THE IRELAND METEOR

THE AIR-COOLED RADIAL ENGINE

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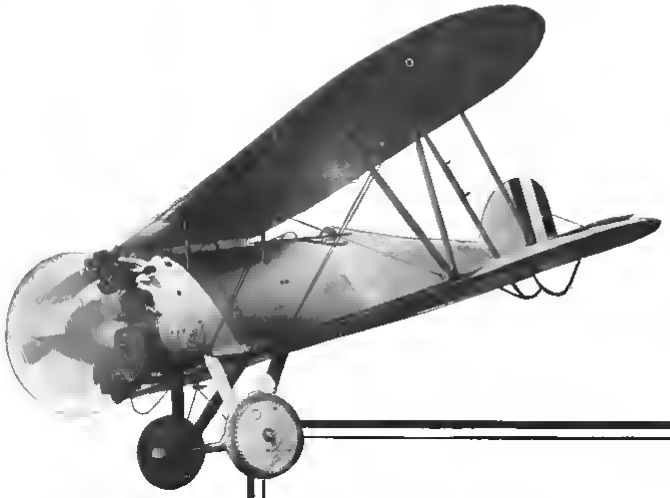

The Pratt & Whitney "Wasp" mounted in the Wright "Apache" single-place plane exceeded the high speed of the standard pursuit ships with water cooled engines and surpassed their climb in ten minutes by more than 60 percent.

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CONTENTS

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AVIATION

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VOL. XX JUNE 7, 1926 NO. 23

Control of Civil Flying

THE BILL to regulate civil aircraft and pilots has passed both houses and has been signed by the President. It is now a law.

During the coming year, regulations will be formulated for the application of the law. The year will, therefore, be a critical one, for, on the spirit of the regulations to be drawn and on the manner of their application, depends the question as to whether the law will foster or strangle civilian aviation.

Congress passed the law for the purpose of promoting civilian aviation. There is nothing in the law itself which will injure commercial flying. In fact, the law will give flying a sounder standing and a more dignified position in the community. It will help develop airways and the means of keeping in check those incompetent or reckless pilots who have been a harmful influence in many communities. It will increase public confidence in the competency of pilots and the airworthiness of aircraft. It will afford facilities for the checking of new designs at small cost and yet it will in no way interfere with experimental flying. Authority for government regulations of civil aviation is now on the statute books, and pilots will do well to accept the law with an open mind and in a spirit of willingness.

So much for the law. The regulations to be drawn up for the enforcement and administration of the law are, however, an entirely different matter. Here the pilots must get together and fight for their interests. Unless the pilots take a part in the administration of the law, the inevitable will happen and the political ignoramus or the Modock who can pull the most wires will be put in charge of controlling civilian aviation. Equally harmful would be a high-minded and sincere individual who felt that absolute enforcement of an engineer's safety code is the only way to promote aviation. The law will not strangle commercial aviation but the wrong man at the head of things, the wrong sort of regulations and a spirit which seeks to control and not to promote, will retard flying in this country to an enormous extent.

It is up to the pilots and operators to take an active interest in the personnel of the new civil aviation bureau, in the drawing up of regulations and in the administration of the law, and their cooperation should be welcomed by those in authority. They can do this only by getting together and making themselves heard in Washington through an active committee which will closely follow this situation.

This is a subject which AVIATION will carefully watch and, from time to time, report on. As in the past every effort will be made to reflect the best judgment of the pilots, operators and all others concerned with the many aspects of commercial aeronautics and to make their influence felt where it will do the most good. But the essential thing is concerted action by the men who have established civil flying in the United States.

The Aeronautical Engineer

THERE ARE, in most aeronautical enterprises of any considerable size, two parties. One, the flying personnel and the other, the men who put up the cash to start the enterprise. Both groups probably think that they know a good deal about the other groups problems but actually they do not. There are very few flying men who know much about business and there are fewer business men who know much about flying. Yet, if the enterprise is to succeed, it must be developed in the two spheres, simultaneously. There is often need of a mediator between the two groups and it is often very well worthwhile to have an outside party render an opinion on the operations of a company.

There are certain men and firms who make it their business to give advice as to the management and operations of other peoples affairs. These men gain from experience an ability to size up a situation and reach the heart of the problem which the busy executive or the financial backer has missed. Especially at the start of a new enterprise, it is well to have some outsider, experienced in such matters, check up on the general plan of action and render an opinion and give advice. There are men who have specialized in the study of air transport questions and the comparatively small charge which they make for their services and advice is certainly a good form of insurance against mistakes or deception.

In the design of new planes, the advice of a competent consulting engineer is most valuable. A design can be gone over by a consulting designer in a comparatively short time and he may catch an error of a serious nature or, at least, offer some worthwhile suggestions. Especially where a new plane is being financed by an individual, it will pay him to consult an outside man in order to get an unbiased opinion as to the claims set forward.

Exploring By Air

AT A TIME when the airplane and airship are vividly exhibiting their serviceability as a means of gaining access to previously unexplored areas of the earth at the North Pole, it is interesting to note similar activities in the realms of exploration, equally interesting even if less picturesque from the public standpoint. Reports are now beginning to come to hand of the progress being made by the Stirling expedition into the wilds of Dutch New Guinea in an endeavor to explore the mineral wealth of the land and learn whatever there may be to learn about the pygmy inhabitants. Without the aid of the airplane with which the expedition is equipped much of the potential possibility of the undertaking would be lost, for to reach the most inaccessible parts of this region would be impossible on foot. The expedition has only recently made its first flight, with much success, and little can be said at this time but that the airplane is again about to demonstrate its possibilities from the standpoint of exploration is undoubted.

Aeronautics With the Navy

Curtis D. Wilbur, Secretary of the Navy, Discusses Naval Aviation Activities and Interests.

That the Navy Department has done a very great deal in the development of the science and art of aviation must be more and more recognized, and, in the January issue of "Current History", Curtis D Wilbur, Secretary of the Navy, discussed the various aspects of naval aviation activities at considerable length, opening with a discourse on wartime developments While it is neither possible nor desirable to reproduce in full Mr Wilbur's article, it, nevertheless, deserves attention and, accordingly, much of the contents of the original article has been summarized—EDITOR

VERY NATURALLY the primary interest of the Navy in aviation is wrapped up in the possibility of taking airplanes to sea with the fleet and operating these from ships while under way The airplanes thus function as the "eyes of the fleet" in addition to proving of extreme offensive value in naval operations through the agency of bomb dropping and torpedo carrying [Although, just why an airplane, which has such a good use for its existence as a bomber, should be called upon to carry a weapon such as a torpedo and be obliged before launching it to bring itself into dangerous proximity of the enemy horizontal guns, which are far more efficacious than are anti-aircraft weapons, and, after all this, still have a comparatively poor opportunity of aiming the torpedo accurately enough to hit its objective, is a doubtful question—EDITOR] Thus, then, the aircraft carrier becomes one of the greatest aviation interests with the Navy

In view of the necessity for economizing space on board aircraft carriers as well as for economizing funds, it was determined that a new type of plane should be developed for such carriers which would combine the qualities of the scouting plane, the torpedo plane and the bombing plane. This three-in-one or three-service plane was an altogether new type of plane and required large expenditures of money for its development It required, among other things, a new type of engine of high power and light weight, because the torpedo, after years of development, was already standardized, and the minimum weight of such a torpedo was 1,600 lb. The three-service plane had, therefore, to be built around the existing torpedoes, so as to carry such torpedos as far and fast as possible

In the development of the new plane, the engineering ability of the Bureau of Aeronautics and of the manufacturers was utilized in cooperation in an attempt to secure this new result. This plane had to be able to carry a torpedo The desired qualities were that it should carry a torpedo weighing a ton (or preferably one of 3,000 lb weight), or a bomb or bombs of equivalent weight; also that it could, by leaving off the torpedo or bomb, substitute gasoline tanks, adding a ton or more to the weight of gasoline carried, and thus have a radius of action of two thousand miles—a thousand miles out and a thousand miles back.

The Navy has not yet reached the goal sought The largest torpedo they have been able, so far, to carry is the minimum one, weighing about 1,600 lb Of course, a bomb of corresponding size can be substituted. The range of action for such a plane, when substituting weight of gasoline for weight of bombs or torpedo, is 1,000 miles instead of the 2,000 miles desired

It is difficult for a layman to appreciate the difference between a plane which can carry a 3,000 lb or a 2,000 lb torpedo and one which can carry a 1,600 lb torpedo. Suffice it to say that, with the 1,600 lb torpedo, it would be necessary for the torpedo plane in launching this torpedo to approach so near the target and so near the water that the destruction of the plane by the ship's guns would be likely.

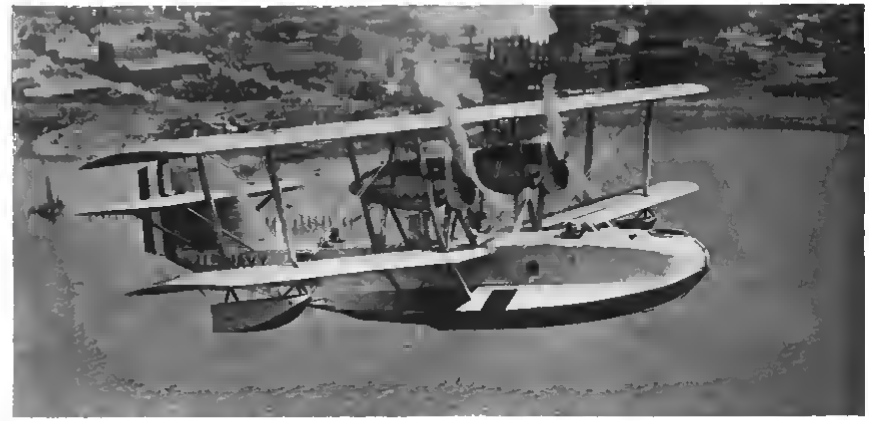
Greater Torpedo Possibilities

On the other hand, if the torpedo plane can carry a torpedo weighing a ton, it can be launched at twice the distance,—say, from 6,000 to 8,000 yards from the target,—and if it can carry a 3,000 lb torpedo, it can be launched at a distance of about three times as great, because of the greater range of the torpedo The chance that the plane will be hit by the guns of the ship is tremendously lessened by the increased distance

In connection with the development of this plane, its weight-carrying capacity and its range of action as a scouting plane, launched from the deck of a carrier, depend, not only upon the load of gasoline it can carry but upon the efficiency of the engine, that is to say, upon the weight of the engine per horse power Consequently, the development of the engine for this plane, as well as for all others, is of the utmost importance Every pound that can be taken off the engine, or saved through efficiency, can be utilized in the torpedo,

Underwood and Underwood

Curtiss three-purpose planes (Wright T2 engines) in training operations off Cuba, in Guantanamo Bay



The Navy PN-9 patrol seaplane (two Packard 1A 1500, 510 hp. engines)

in the bomb or in the supply of gasoline carried Great advances have been made since the war in the development of engines for this type of plane and a large number of them are now in use

Without further elaborating upon the work that has been done upon these three-purpose planes, it will be observed that the Navy Department has attempted to develop a plane peculiarly its own, a type especially adapted to the needs of the Navy. In this respect the Curtiss Aeroplane and Motor Company has contributed to no small extent

Patrol Planes

The large flying boats for patrol work are extremely costly We can build two of the three-purpose type for about the cost of one of the patrol type. As a measure of economy, therefore, the three-purpose plane is now being used for a fourth purpose of patrol, but the development of the patrol types in small quantities so that they may be ready when needed is being continued The PN-9's used in the Hawaiian flight are examples of this development

The Hawaiian Flight

The Hawaiian flight was for the purpose of testing the patrol plane or flying boat It presented the consummation of efforts, which began in 1917, to produce a plane that would cross the Atlantic Ocean This development, although begun in 1916, was not completed until after the war was over. The NC plane was the result This plane made the flight in 1919 from Newfoundland to the Azores, thence to Portugal, thence to France and to Plymouth, England, the first transatlantic flight of a seaplane.

The difficulties involved in such development are manifest, not only by the fact that it took nearly four years to produce the NC planes, but that, of the three planes which started, only one succeeded in the effort. One of the planes landed some fifty or sixty miles from the Azores and was not found by the searching ships but taxied in to the island Another landed and was rescued by a merchant ship The longest leg of this flight was 1,340 miles

The PN-9 Flying Boat

A brief comparison of the NC flying boat, begun in 1917, and the PN-9 flying boat, completed in 1925, will indicate some of the steps in the development of this type of plane. The hull of the PN-9 flying boat was of riveted duralumin instead of wood. The principal reason for this change is the fact that duralumin does not absorb water, whereas a wooden hull of this size, when in the water for a considerable period of time, absorbs nearly half a ton of water which, of course, correspondingly diminishes the capacity to carry gasoline The increased weight of water meant that 1,000 lb less of gasoline could be carried. The power plant of the NC boat consisted of four Liberty engines, each of 400 hp., a total of 1,600 hp., while the power plant of the PN-9 boat consisted of two Packard engines weighing less than two Liberty engines and having a combined power of over 1000 hp., nearly equal to three Liberty engines. It was believed that the metal hull of the PN-9 flying boats would be more durable than the wooden hull of the NC boats, but it was not fully appreciated, until after the 450-mile voyage of Commander Rodgers and his crew in this plane after it landed in the Pacific, that the duralumin hull was so much more durable than the laminated wooden hull had proved to be in previous flights

The Boeing plane (PB-1), which was to have taken part in this flight, weighed 26,500 lb., as against 28,500 lb for the NC flying boat and 19,500 lb for the PN-9 boats The PB-1 has two Packard engines with a total power of 1,600 hp., which weigh 2,600 lb as against 3,600 lb for four Liberties. This saving of 1,000 lb for the same power output is a measure of engine development of the last few years.

Another advantage possessed by the Boeing plane is the fact that the two engines are mounted tandem, so that the plane can be flown with one engine after its weight has been reduced by the consumption of a portion of the full load of gasoline By using one engine alone, not only is the gasoline consumption decreased, but the chances of reaching the objective are greatly increased

As an indication of the development of these patrol planes in five years it may be stated that the interval between the surface ships stationed along the line of flight in the Hawaiian flight was 200 miles, while in the transatlantic flight in 1919 it was fifty miles This increased interval, four times as great, represented the judgment of those in charge as to the progress of the development of this type of plane and of its equipment

Round-the-World Flying

The importance of this flight to Hawaii has perhaps not been fully appreciated. If a flying boat can be developed that can fly from the Pacific coast to the Hawaiian Islands, that plane can fly around the world without crossing the Arctic Circle The distance between the Coast and the Hawaiian Islands is longer than any other water interval in the transpacific flight, and is the longest hop necessary in such a round-the-world flight Such planes can take advantage of the fine weather conditions of tropical or semi-tropical areas without being subjected to the extreme hazards of the shorter northern route In short, if such a plane can be developed with sufficient reliability, the plane can fly to any point in the world accessible by water, if she can be supplied with fuel at her landing places

Three Years to Develop a Plane

It takes nearly three years to develop a new type of plane. This period represents the constant effort of many experts

concentrating upon the determination of the fundamental characteristics of the new plane, the balancing of its weights, the reduction of its wind resistance and developing carrying capacity and speed. Like all new developments, there is always a chance of failure.

As an illustration of a disappointment of reasonable expectations we may cite the case of the first of the new "three-purpose" service planes delivered in 1924. A contract was let for the first of the new triple service planes, and so confident were the contractors of the success of their undertaking that they guaranteed certain performances of the plane. For instance, it was guaranteed to attain a ceiling of 6,000 ft.; it was to have a speed of 100 m.p.h. When the plane was completed, in accordance with the design and after the greatest possible care in its production, it was found impossible to get the plane higher in the air than 4,500 ft. with the guaranteed load. This difference, with the resultant disappointment, must be accepted in our constant effort to reach out for bigger and better accomplishments.

Some Disappointments

This same three-service plane, further developed after great difficulty, had engines which were apparently as good as anything so far built in the world. It was felt by the Bureau of Aeronautics that they had, at last, in 1925, accomplished the task which had been set for them in 1922 by the General Board. The pilot of one of the new planes, equipped with the new engine for a trial flight while taking off from the water suddenly discovered that his engine had vanished. Another new plane equipped with a similar engine was flying at a height of 2,000 ft. when the pilot discovered that his engine had also mysteriously disappeared. Happily he landed successfully without injuring anyone, but the plane was wrecked. The damaged engine of the second plane was recovered, and an examination of the propeller as well as of other propellers brought about the conclusion that the fault lay in the propellers. The wooden propeller had broken up as the result of the high speed and power of the new engine and the engine under the unbalanced force from the broken blade jumped off the bed plate and out of the plane. [D. L.—Editor.] A different type of propeller was installed in the other airplanes of the same model and these have since functioned perfectly and fully realized the expected performance. This incident not only illustrates the necessity of testing new equipment but shows that the development of the plane, of the engine, and of the propeller must go hand in hand and that each advance may be attended by wholly unforeseen difficulties.

Bombing Planes

In the matter of bombing airplanes, it is not sufficient to develop bombing planes that will carry a bomb and drop it somewhere near the enemy ship. It is necessary to drop the bomb either on the deck or close alongside the target. For this purpose bombing sights must be developed. The most effective bomb to be dropped on board ship is one that will pierce her deck armor and explode underneath it, but the amount of explosive carried by such an armor piercing shell will be utterly ineffective if dropped in the water alongside a ship. The probability is that armor-piercing bombs will not be used because of the comparatively slight chance of being effective, that the bomb used will be one calculated to damage the ship most seriously, if it explodes close alongside, but it will carry sufficient explosive to do considerable damage above the protective deck of the ship if it strikes the ship, although in such an instance the damage would be in no case vital, and that dependence will be placed not on a single extremely large bomb, say of 4,000 lb., but on a number of hits by smaller bombs of over 1,000 lb. Again, it must be determined at the time the bomb fuses are designed for depth, at what depth the explosion must take place. Now, the most effective point of explosion varies in depth in accordance with the distance from the side of the ship. But it is impossible to determine how far from the ship the bomb will strike, as this depends on the accuracy of the bomber, so that undoubtedly the fuse will be set for an average depth, and the attacking party must, therefore, be contented with some damage less than the maximum possible by the explosive charge unless the bomb happens to strike at the most effective distance from the ship, for that depth.

Constant experiments have been carried on by the Navy Department to determine all the factors entering into the problem of the amount of damage to a ship due to underwater explosion. These experiments have been carried on for years and they have taken various forms, such as construction of miniature ships and discharging small amounts of explosives proportioned to the size of the model, the building of full size sections of a ship and the use of full explosive charges against it, the building of blisters on the outside of the battleship South Carolina and the explosion of TNT in contact with the skin of the ship at a predetermined point. The experiments culminated in the explosion of charges against the skin of the Washington and at varying depths and distances from the outer skin of that ship. It has been surprising to see how closely the actual results upon the Washington and South Carolina followed the results of calculations and experiments on a smaller scale theretofore conducted.

In the meantime the Navy is increasing the accuracy and the power of anti-aircraft guns and building fighting aircraft to drive off enemy bombers. They can build additional compartments within the ships already built, thus, in effect, building a new inner skin to the ship, and the bombing plane must

Underwood & Underwood

The new 5 in. anti-aircraft guns of the U.S.S. West Virginia, the first of their type to be fitted on any ship. During recent tests, a number of direct hits were obtained with these guns at sleeve targets towed by an airplane at 60 m.p.h. and 12,000 ft. altitude

then be further developed to meet this new construction. The Navy is interested, not only in one of these developments, but in all of them, not alone in its ships with anti-aircraft guns and inner compartmentation and outer blisters, but also in the means of attack by bombing planes at increased heights with larger bombs and with better bomb sights.

Observing Planes for Long-Range Gunfire

Our fleet, like that of every other nation of the world, is primarily based upon the utilization of gunfire for offense and defense. New problems arise in connection with these means of offense and defense. The most notable development in the realm of naval warfare has been increased ranges at which battles will be fought, made necessary by the continuing development of the torpedo, and by the increasingly destructive effect of gunfire.

In view of the fact that modern long range gunfire is largely a matter of trial and error,—that is to say, all subsequent shots are based upon observed results of those preceding,—it is essential that the exact location of the splash of the previous salvos should be known. For this reason, the development of the observing or spotting plane has been carried on in order that such a plane may fly comparatively near the enemy's ship and report from its advantageous position the fall of the shot. The value of this plane depends upon the development of a system of radio communication, upon the ability of the plane to carry an observer who has sufficient knowledge to correctly report what he sees and to determine from which of the ships the shells upon which the plane is reporting were fired. In this work, therefore, it has not only been necessary to develop a new and light receiving and sending radio equipment for planes, but to develop new planes and new engines themselves and train the men in actual work of coordinating their effort with that of the fleet. These planes must be protected by fighting planes.

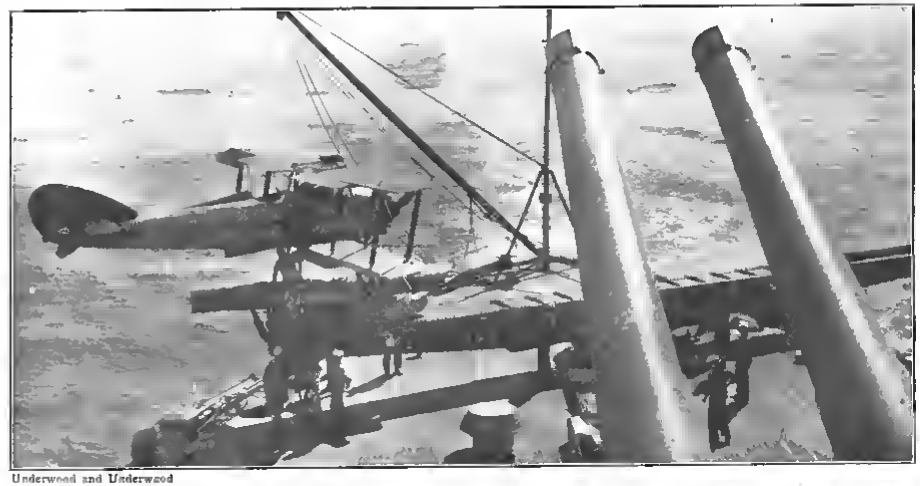
Planes on Ships

It has been the policy of the Navy not only to build aircraft carriers but also to place aircraft on practically all our ships. The catapult developed by the Bureau of Aeronautics, for the projection of our aircraft from the battleship or cruiser, is one of the outstanding developments of the service and has made it possible for each battleship to carry its own spotting plane and a fighting plane for its protection.

In the closing days of the Conference for the Limitation of Naval Armament it was agreed by all powers that the tonnage limitation for aircraft carriers should be 27,000 tons. It was also agreed that the total tonnage of the aircraft carriers for all powers should be as follows:

Great Britain	135,000
United States	135,000
Japan	81,000
France	60,000
Italy	60,000

At the suggestion of our naval experts and for the purpose of economy, it was later agreed that each of the powers might build two aircraft carriers from ships already building and designated to be scrapped, or new construction. Acting under this provision of the Treaty the Navy is completing two aircraft carriers, the Lexington and the Saratoga, which will be the largest ships of their class in the world. The planes for these ships are yet to be built, and will be the best planes that can be developed before their completion. Such development is still in progress.



Underwood and Underwood

A U.O.1 seaplane (Wright Whirlwind) about to be shot off the catapult on board the U.S.S. West Virginia

More Experiments on Injection Engines

A report, entitled, "Spray Penetration With a Simple Fuel Injection Nozzle", by Harold E. Miller and Edward G. Beardsley, has recently been published by the National Advisory Committee for Aeronautics.

The tests covered by this report form a part of a general investigation of the application of fuel injection principles to aircraft engine service. The purpose of these tests was to obtain specific information on the rate of penetration of the spray from a simple injection nozzle, having a single orifice with a diameter of .015 in. when injecting into compressed gases.

The fuel was sprayed into a chamber fitted with glass walls and filled with nitrogen at various pressures. Special high-speed photographic apparatus, capable of taking a continuous series of 15 photographs at a rate of 4,000 per sec. was used to record the development of single sprays. The effects of fuel pressures from 2,000 to 8,000 lb. per sq. in. and chamber pressures from atmospheric to 300 lb. per sq. in. on the rate of penetration and the development were studied.

The results have shown that the effects of both chamber and fuel pressures on penetration are so marked that the study of sprays by means of high-speed photography or its equivalent is necessary if the effects are to be appreciated sufficiently to enable rational analysis. It was found for these tests that the negative acceleration of the spray tip is approximately proportional to the 1.5 power of the instantaneous velocity of the spray tip.

A copy of the report, No. 222, may be obtained upon request from the National Advisory Committee for Aeronautics, Washington, D. C.

Aeronautical Exports

The Bureau of Foreign and Domestic Commerce, Department of Commerce, announces the following aeronautical export statistics for the month of February, 1926. The figures relate to exports from the United States and are classified by countries:

Countries	Engines for aircraft Number	Engines for aircraft Dollars	Airplanes and other aircraft Number	Airplanes and other aircraft Dollars	Parts except tires Dollars
Netherlands					35
Soviet Russia in Europe	15	45,068			14,158
United Kingdom	552	6,006	1	5,650	
Canada	1	50			1,667
Mexico			1	10,000	206
Cuba					85
Argentina					250
Brazil					2,930
Chile					30
Total	568	67,424	2	15,650	19,371

The Air–Cooled Radial Engine

An Outline of the General Features of Air-Cooling and the Radial Type of Engine.

By ROBERT W. A. BREWER
Pitcairn Aviation, Inc.

WHAT IS the immediate sphere of usefulness of the air-cooled static radial engine? An attempt to answer this question from the viewpoint of the commercial operator will be made, and the following outstanding channels at once come to mind —

1. For light machines, which are scarcely yet in production in this country mainly on account of the absence of a suitable low priced engine.

2. For two- and three-place taxi and "hop" planes, types of which are in large production now, this type of machine is possible at the moment because of a surplus of war built engines procurable at a low figure. As a follow up to these engines there is a large prospect in view.

3. For multi-engine machines, the advantages of which are now fully recognized from the point of view of reliability of operation. Further, the engine designer's problems become less serious when a certain maximum power output can be obtained from a greater number of smaller cylinders than from a few cylinders of large dimensions and high specific output.

4. For machines which must operate in extremes of climate the advantages of the absence of water in cold climates is obvious, and the warming up period is markedly shorter with an air-cooled than with a water cooled engine. It is an interesting fact also that an air-cooled engine will operate much better in hot weather than will a water-cooled one. The reason is not far to seek when actual working temperatures are considered. This point will be dealt with in detail later.

5. For machines in which servicing is an important factor, a static radial is much more accessible and more quickly serviced than any other type of aero engine.

6. Where a geared propeller drive is desired in order to give a maximum static and low speed thrust so as to enable machine to rise from a small landing field. The adaptability of the static radial engine for this purpose may, at first sight, be not so obvious. The answer is that this type of engine enjoys almost complete absence of inertia torque resulting in elimination of crankshaft torsional vibration. Thus, the incorporation of reduction gears becomes a much simpler problem than is the case with a long multi-throw shaft. The intermittent loading on the gear-teeth of the latter combination calls for the interposition of some form of clutch or vibration damper. With the absence of torsional vibration, gearing becomes feasible at low additional cost and weight.

This short summary gives some idea of the vast field of possibilities for the static radial air-cooled engine and it indicates how near is the era of "flying for the masses", a very worthy ideal to be aimed at.

Historic Achievements

In reviewing this subject it will be well to touch upon the general development of this Art, and, although we must go back only a few years, the few outstanding achievements should be noted.

Let us look back to the year 1909 when the commercial side of the aviation industry was really born. The year holds a significant date, July 25, when Bleriot crossed the English Channel in his plane, equipped with a 25 hp. air-cooled radial Anzani engine. Probably this event, more than any other, established the fact that aviation had arrived. The insularity of England was threatened and the country was rudely awakened to the fact.

It was to France, however, that the original development of the air-cooled radial engine was due but its potentialities were fully recognized afield. In January of the year 1910 the writer became associated with a certain British sportsman and carried out considerable work with Anzani and Gnome engined planes culminating in an attempt for the $50,000 prize offered by the *London Daily Mail*, on April 27, 1910.

Transportation of passengers was inaugurated on May 29, 1910. The machine used being fitted with an air-cooled Gnome engine of 50 hp.

It was at once realized that an engine of this power was insufficient for commercial work so the writer devoted much time to the design of a static air-cooled radial engine comprising features specifically aiming at the increase of reliability and freedom from complete breakdown. Much credit is due to Esnault Pelterie for his keen perception and ingenuity in meeting and overcoming early difficulties with radial air-cooled engines, but it is a curious fact that early designers failed to grasp the solution to the problem of cylinder cooling up, which is now met by the protrusion of the cylinder barrels into the crankcase and the use of a scavenge pump. We must remember, however, that the scavenge pump has not been introduced at this time in any engines. This omission was probably the cause of much of the dormancy in radial engine development which lasted for some years.

The mind of the constructor was quick to grasp the advantages of air cooling, even combined with its drawbacks, so that the rotary air-cooled engine went through a period of development lasting well into the early stages of the War.

High Power Radials

Limitations were reached with this type and the quest for higher power held attention in other directions. Eventually the Cosmos air-cooled radial engine came into being. This was a triple three, and later, in the hands of A. H. R. Fedden, emerged as the most successful engine of the kind produced at that time. The sudden leap of this engine into favor, and the construction of others along somewhat similar lines, is shown in the remarkable entry of machines for the King's Cup race in England last year when all but one were equipped with this type of engine, now known as the Jupiter. American activity in this direction has also been considerable and equally successful results have now been achieved.

This brief survey will suffice to show that certain lines of development are liable to progress in phases rather than in a gradual upward tendency.

The chief ambition of the designer of an airplane engine is the attainment of a high power-weight ratio, combined, of course, with reliability of operation. Weight saving need not mean sacrifice of reliability nor low factors of safety,—on the contrary, reduction of weight in a certain well considered manner will often lead to reduction of stress in the actual part or in some other parts affected by movement or loading of the aforementioned part.

The fundamental of weight saving is to so distribute the material in the structure that each portion is stressed to its maximum permissible extent for the greatest percentage of time during the functioning of the engine. It, thus, becomes obvious that material which is only stressed functionally when considered from a time basis, is less efficiently employed than material under continuous loading.

Take for example a crankcase comprising a mass of material of considerable weight. It should be the object of the designer to use *all* the material *all* the time. The same may be said of the crankshaft, and so on, down the line. Further, the nature of the stress is important because, in engineering structures, certain kinds of stress can be resisted more effectively than others when considered from the basis of "weight of material". The most convenient stress to handle is that of tension in materials such as are employed in aircraft engine construction.

Bearing these points in mind, it will be obvious that any engine designed to comply with the basic principles will show inherent advantages from a weight consideration.

Next, there is the matter of vibration to deal with. This is a subject of much complication but can be reduced to a few main channels. Apart from vibrations due to lack of mechanical balance, those due to inertia torque are difficult to cope with and frequently are the most troublesome. Inertia torque is due to the alternate acceleration and retardation of pistons and connecting rods, with consequent alternations of stress in the crankshaft. When six cylinder automobile engines were first put into production, torsional vibration made itself known to the general public, manifested by pronounced periods at certain engine speeds which produced uncomfortable driving conditions. Crankshaft whip was accompanied by excessive wear of the timing gears and some of the main bearings. Inertia torque is one of the principal defects of the "in line" engine and can only be ameliorated by the use of very stiff crankshafts and crankcases. While design can play an important part, addition of weight becomes almost imperative.

Gearing Problems

Reference has been made to the subject of gearing. It will now be clear that, when such lightly loaded parts as timing gears suffer abnormal wear due to angular deflections of crankshafts the transmission of the total power of the engine through a train of gears must impose very high instantaneous loading upon the contact surfaces of the gear teeth.

International Newsreel Photo

The first photographs from Spitzbergen — Commander Byrd's three-engine Fokker (Wright Whirlwinds) being ferried through the ice from the SS Chantier to the King's Bay shore.

Wide World

The first photographs from Spitzbergen — Commander Byrd's plane being landed from the raft onto the King's Bay shore.

There are means by which the periodic flexure of the shaft can be damped from the gears consisting of flexible clutches or spring drives. Elimination of the cause is naturally preferable and, in single bank radial engines, this is inherent in the design, there being practically no inertia torque.

Some stress has been laid upon the subject of gearing because the writer believes that a geared radial engine has considerable promise. Successful builders of static radials have carried out a certain amount of experimental work along these lines but the demand for their product in its direct driven form has been so great that little time has been available for full development of a geared engine. While discussing gearing we can well look into the limitations of the radial engine as regards "revving". A start was made with the premise that power to weight ratio was dependent upon reduction of weight. It also hinges upon production of power. This, in turn, means high mep and high speed of revolution. These two form the least bright side of the picture in static air-cooled radial development and call for very careful design. Extensive experiment and research has shown that high mep can be obtained if expense is of secondary importance. Our commercial instinct will call a halt at some boundary line which will be marked in dollars. Designers must decide for themselves where this boundary line must fall.

Fuel Versus Output

When we strive for high specific output we are at once faced with the servicing and fuel problems. The writer believes that the commercial operators would prefer to have engines of a more conservative output combined with ability to use automobile fuel. Further, continuous performance over lengthy periods may easily outweigh in advantage the possibility of somewhat greater performance coupled with the necessity for frequent overhaul.

Metallurgy has helped enormously in providing valve material. Detail design of parts in which heat flow is of major importance gives the designer scope for his ingenuity. A suitable disposition of the right material will result in a specific power output not inferior to that of a water-cooled engine measured from a cost basis.

Speed of rotation appears to have some limitation in the static radial due to the loading on the crank pin. Even this is probably only one phase in the development of the type. In the Jupiter engine, for example, means are provided for neutralizing part of the load on the pin by attaching suitable balance weights to the big end of the master rod. There are other expedients such as high oil pressure and oil cooling so that the end of the rod has by no means been reached. Materials again give opportunities for revision of design and application so that we may look for speeds of rotation higher than 1700 h.p.m. which seems normal at the present time.

Having touched upon some of the high lights in the quest for maximum power-weight ratio, let us see in what measure the static air-cooled radial complies with the desirable:

1. It is the most compact engine as regards axial length, utilizing a short, stiff crank shaft with a single throw which is 100% loaded all the time.
2. The crankcase is 100% in tension and there is practically no bending moment and, therefore, no tendency to distortion.
3. The form of the material can be made conveniently and cheaply so as best to resist the loading imposed upon it.
4. The pieces are almost entirely symmetrical and round; they are easy to handle and to inspect; can readily be tested; and are practically free from internal stresses which are generally found in unsymmetrical pieces.
5. There are very few different kinds of pieces and one engine is composed of a number of similar parts which can be made interchangeable. The stock room problem is simple.
6. Storage of short cranks and small crankcases is an easier and simpler matter than is the storage of long pieces and they are not so liable to damage.
7. There are no difficult fitting operations and lining up is fairly simple.
8. A minimum of two and maximum of three main bearings.
9. A single big end bearing to fit on the crankpin.
10. No water connections.
11. Simple mounting and dismantling, a swinging mount has been successfully used, giving instant access to all external parts of the engine.
12. Simplified cowling. Many modern engines almost dispense with cowling as usually formed, reliance being placed upon individual helmets on the cylinders.
13. Simple thermal regulation.
14. Ready examination of the adjustment of the valve operating mechanism.

Concentration of engine torque on a single crankpin and a mass having a center of gyration coincident with the center of the engine in the path of the pin, results in a concentration of turning moment. Careful balancing should provide for reduction of vibration on that score.

Pressure Balance

We have not so far touched upon pressure balance which also is of great importance. By that is meant equality of firing pressure and mean pressure in the engine cylinders. This, again, is a function of proper carburetion and distribution of the mixture to the individual cylinders. Many an otherwise good engine is rough in operation due to bad distribution. It is well-known how difficult this problem is in line engines. Multi-carburetor installations have been used to mitigate the evil. Early radials suffered badly because equal distribution of the explosive mixture was almost non-existent. Modern practice has made some advance in this respect and one notable step was the multi-passage inlet manifold of the Jupiter. The writer's early engine had a duplex ring manifold construction with two carburetors, the rings being formed integral with the end of the crank case. Again, we have rotary distributors as used in the Siddeley Jaguar engine and later developments of this scheme show further promise.

Inherently, the radial should give ideal distribution as all the branch pipes can be of the same form, length, contour, size, etc., and in operation, the internal forces acting upon the mixture are so much greater than that of gravity that the latter ought to fade out of the picture.

The Ideal Engine in Sight?

So, considering everything, we have in the radial many inherent features which make for an ideal engine. Past failures of this type are largely due to faulty installation; excessive consumption of fuel and oil, overheating, particularly on the ground, failure or excessive wear of valve mechanism, all of which can be overcome by proper foresight in the design and reasonable care in operation.

Engine Lubrication at Low Temperatures

The characteristics of lubricants and lubrication systems, with particular reference to the extent to which they are influenced by change in temperature, are being studied by the automotive power plants section of the bureau under authorization from the Bureau of Aeronautics of the Navy Department. For this purpose an air-cooled radial engine has been mounted in one of the altitude chambers in which the necessary low temperatures can readily be obtained. The engine is provided with complete equipment for measuring oil flow under various conditions. Measurements with this engine are being paralleled by an experimental study of the pump and other elements of the lubrication system.

This work is of fundamental importance because at low temperatures the transfer of the oil from the supply tank to the pump and thence to the bearing surfaces is attended with a great deal of difficulty. Indeed, under these conditions oil may flow more slowly than the proverbial "cold molasses." Therefore, the dimensions of the pump and feed lines must be sufficient to insure adequate lubrication, and yet provision must be made to prevent overcooling when temperature conditions are such that the oil flows freely.

A Waco Price Reduction

One of the most interesting announcements at this time in commercial aeronautics is the new low price of the Waco 9 three-seater commercial plane. The new price is $2250 and the design has, in many respects, been improved as a result of experience gained through the extensive use to which the Waco 9 has been put in all spheres of commercial and pleasure flying.

So popular has the Waco proved as a light commercial plane that the factory of the Advance Aircraft Co. of Troy, Ohio, is operating at full pressure to meet orders. The reduction in price is likely to have the effect of further increasing the demand for this plane.

Titanine Dope in World-Wide Use on Planes

Aviation during the past few years has given the world a glimpse of the performance possible to the airplane as an annihilator of distance and an explorer of remote parts of the earth inaccessible heretofore. There have been the South American Trans-Atlantic Flight, the Round-the-World Flight, the Rome-Tokyo-Rome Flight and the Pygmy hunt now in progress in Borneo. The reading world knows of these achievements principally through the pilots and the planes they have used. But in back of each new flying achievement stands a host of manufacturers and researchers whose skill and diligence have made possible the planes and the equipment.

The various dopes and finishes used on aircraft may be a prosaic subject, but one which is of great importance to the pilot. An illustration of this can be cited in the satisfaction which has been expressed by such pilots as Allen Cobham and the Marquis de Pinedo, with the service given by the dopes manufactured by Titanine, Inc., of Union, N. J. Allen Cobham, veteran of many flights and one of Great Britain's most famous pilots, has used these products in places where the severest tests must be met. Mongolia, Kimberley and those portions of the tropics where the rainy season must be withstood, have had no effect on the efficiency of Titanine dopes and during the entire 35,000 mile trip of Marquis de Pinedo they answered the needs of the flight perfectly.

When the Round-the-World flight was in preparation, it was to the Titanine product that those equipping the Douglas Cruisers turned and the entire contract for MB-3 scout planes, produced by the Boeing Company two years ago, as well as more recent construction by this Company, were finished with Titanine dope. At the Schneider Cup Race and the Pulitzer Race this product also played its part.

At the request of the Army Air Service experiments are now in progress at the Titanine laboratories on a gloss pigmented dope to secure a finish in one coat. This can be accomplished now in two coats, but a one-coat job for wings, struts, wires, etc., enables a clean-up coat to be applied over the whole plane without dismounting.

International Newsreel Photo

French balloons about to compete in the eligibility race for the honor of representing France in the International Gordon Bennett Balloon Race

Airways, Airways, Airways

The arguments for every municipality in the country having its own airport are many and this feature of commercial air development is one of the most important that there is. The arguments are not new; individual campaigns for municipal airports have been carried on all over the country with varying degrees of success. But it is not always that the arguments are put in such lucid form as was done recently by Daniel Rochford, aviation editor of the *Boston Evening Transcript*, in his regular column—"The Week at the Boston Airport". The following is an extract from his remarks on this subject, which appears to be particularly pertinent.

People ask when commercial aviation is coming and they ask about airplanes. They are wrong. Suppose, when the railroads had started, everybody just built nice locomotives. All wrong. The tracks—that's what made the railroad. So with motor trucks and automobiles—the highways had to come first, before any large commercial use could be made.

Why, even with saddle horses—a few years ago the old-timers patched their last suit and ebook their heads. The horse had been driven from the highways. Riding was done. Then the intelligent few went out and forced the non-riding public to build bridle paths in the parks. Today, there is more saddle riding than ever before and it is increasing every year almost geometrically.

So with airplanes—we've done too much talking about the building of planes. What we want is airways, airways, airways. All this talk about single engine planes being inadequate—pure bluster, if you had real airways with emergency fields every five or ten miles.

When they ran the railroads across the country, who paid for that land? The railroad people? They did not! The Government turned it over to them—begged them to take it for the common weal.

As soon as the public wakes up to the fact that there isn't any mystery in aviation, they'll instruct their public servants to get busy and put some public money into the part of aviation where money is most needed, namely, airways.

The answer on commercial aviation is on the ground. It is the airways. Get them and you'll find aviation is here and profitable. Continue to fritter away public interest in fool expeditions to the North Pole where one square mile of ice is no worse than any other; continue to talk of two, three, five and fifty engined planes instead of airways, feed the public brave gestures and mysterious buncombe, do the nothings so many of us are content with doing today, and we'll all be little aviators on our own, with fleecy, white wings and golden harps, and still commercial aviation will not have come!

DANIEL ROCHFORD

Czechs and Poles Conclude Air Agreement

An aviation agreement has been completed between Czechoslovakia and Poland which grants to Czechoslovakia the right to operate an airline from Prague to Lwow and from Lwow to Russia. Reciprocally, Czechoslovakia will permit Polish airplanes flying between Cracow and Vienna to pass over Czechoslovak territory, on the condition that all planes on this line make a landing at Brno.

Two proposals have been submitted to the Czechoslovak Ministry of Public Works to establish a commercial air service between Prague and Trieste, one proposal having been made by a syndicate of Czechoslovak airplane manufacturers, and the other by a group of individuals backed by British capital. It is now reported in Prague that the British group has approached the Czechoslovak syndicate with a proposal to combine their interests.

The Compagnie Internationale de Navigation Aerienne, which maintains the air line between Prague and Warsaw and the line Prague-Vienna-Budapest-Belgrade-Bucharest-Constantinople, is completing preparations to reopen the air route Paris-Strassbourg-Prague. This company also plans to extend the route from Constantinople to Bagdad in the course of this year, and to Teheran in 1927.

The Ireland Meteor

A New Four-Passenger Commercial Airplane With an OX-5 Engine.

FOLLOWING THE success of the Ireland Comet, a description of which appeared in AVIATION Oct. 12, 1925, G S Ireland determined to develop a plane around the "old reliable" OX-5 engine, which would offer commercial concerns or private individuals a feature not at present incorporated in any of the OX 5 jobs now on the market, namely, the carrying comfortably of three passengers and pilot instead of two and pilot as has been customary in addition to having advantages from the structural standpoint.

The seating arrangement is extremely good The pilot sits in the front of the two cockpits with one passenger on his right. His view and that of the passenger is excellent. The cockpit in the rear accommodates two passengers and is very roomy. It is entirely free of controls or wires, A baggage compartment with room for two suitcases is provided

The Ireland Meteor (Curtiss OX-5) four seater commercial and touring airplane

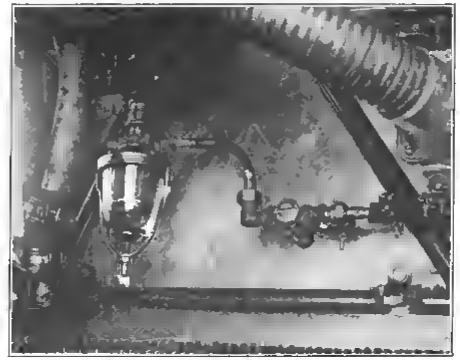
The new machine, which has been named the Meteor, was designed by D J Brimm, Jr., formerly one of the engineering staff of the Curtiss Aeroplane and Motor Co, Inc, and now associated with Mr. Ireland

The Meteor follows the latest practices in airplane design as regards accessories and conveniences for the pilot and the design involves the methods and practices adopted by the Army Air Service as regards factors of safety The fuselage, which is of steel tube with fabric covering and braced along the Warren truss principle, is rectangular in section at the cockpits, changing gradually to a triangular section toward the tail, the apex of the triangle being the bottom longeron This gives a very pleasing appearance and, if desired, the whole rear cockpit may be transformed into a mail compartment, the space thus provided amounting to 30 cu. ft, or more than the capacity of the standard DH mail plane

The control stick is located between the pilot's feet and curves back over his knees so that there is no need for spreading them apart to operate the ailerons The stabilizer is adjustable from the pilot's seat in flight, with ample movement to take care of any change in the center of gravity.

The landing gear is the axle-less type, with compression shock absorbers, thus obviating the wrapping of shock-absorber cord every few months The tailskid also has a compression shock absorber and is steered from the rudder pedals, giving complete directional control of the plane while taxiing, even at low speed.

The engine mounting is quickly detachable and those parts of the cowling which need to be frequently removed are held in place by automobile hood fasteners. The mounting is designed to be strong enough to take a Curtiss C 6 or a Hispano Suiza engine in place of the OX-5 or OXX-6 engines and any one of these engines may be installed without



Installation of the Gascolator in the Ireland Meteor

structural changes. The Wright Whirlwind engine may be installed by the substitution of a slightly modified mounting The gasoline tank may be removed merely by loosening two turnbuckles and without in any way disturbing the structure This will be appreciated by anyone who has attempted to remove the tank from a Jenny

Accessories

A number of desirable features in the line of accessories are supplied, such as an Alemite Gascolator, which eliminates the possibility of water in the gasoline reaching the carburetor, a Pioneer Hydrostatic full level gauge on the instrument board, life-preserver cushions throughout, quick detachable folding windshields, a folding ladder for easy access to the rear cockpit, cockpit covers, etc

The chief dimensions and the manufacturers performance figures of the Meteor fitted with OX-5 engine are as follows.

Length overall	24 ft
Height overall	9 ft. 1 in
Span, upper and lower	31 ft
Chord, upper and lower	5 ft.
Gap	5 ft. 4 in
Stagger	0
Angle of incidence, upper	0
Angle of incidence, lower	0
Sweepback	0
Dihedral, upper wing	0
Dihedral, lower wing	2½°
Angle of ship with tailskid on ground	16°
Span of tailplane	12 ft. 6 in
Area of wings including ailerons	285 sq ft
Area of ailerons	43 sq. ft
Area of stabilizer	15.7 sq ft
Area of elevators	17.8 sq. ft.
Area of rudder	11 sq. ft.
Track of wheels	6 ft
Weight empty	1253 lb.
Useful load	910 lb
Fuel and oil	270 lb
Pilot	160 lb.
Pay load	480 lb
Total weight	2163 lb
Wing loading	7.6 lb./sq ft.
Power loading	24 lb./hp
Fuel capacity	41 gal
Endurance, cruising speed	6 hr
Range, cruising speed	510 miles
Max speed, full load	99 m.p.h
Landing speed, full load	42 m.p.h
Climb to 1000 ft., full load	1 min 40 sec.
Climb to 2000 ft., full load	4 min
Climb to 5000 ft., full load	14 min 30 sec
Service ceiling	10,000 ft.
High speed with Curtiss C 6 engine	120 m.p.h
Initial rate of climb C-6 engine	1100 ft./min.
High speed with Wright Whirlwind	129 m.p.h
Initial rate of climb Wright Whirlwind	1275 ft./min

The first Meteor has been purchased by Mr H C Doyle, of New York City, formerly associated with the Thomas-Morse Aircraft Corporation, and will be used by its owner for extended cross-country tours The ship is ideal for this purpose, for it has a very quick take-off and rapid climb, a long cruising range, and can be flown indefinitely with one finger on the control stick.

A general view of the Ireland Meteor (Curtiss OX-5)

The Ireland Meteor (Curtiss OX-5) This photograph shows clearly the very clean engine cowling with the tunnel type radiator and also the cockpit arrangements with high windshields. The propeller is a duralumin Curtiss-Reed

M.I.T. Aeronautical Engineering Society

With the annual banquet, held on May 12, at the M I T Walker Memorial, the Aeronautical Engineering Society concluded its activities for the school year A number of very successful meetings have been held, and more than the usual activity has been possible Among the outstanding events of the past year have been talks at informal smokers by Lieut Comdr Richard E Byrd, Comdr John Rodgers, Ralph H Upson, Prof E P Warner, C Fay Taylor, and many other very interesting speakers who have spoken on specialized subjects concerning either the flying end, or the engineering end of aviation A booth which the society conducted at the New England Aviation Show in December, demonstrating methods of Aeronautical research, received very favorable comment at the time

The "Aero Society", as it is popularly known among the undergraduate body at M I T, was very fortunate in having Anthony H G Fokker as its guest and main speaker at the final banquet of the year. Mr. Fokker spoke in details of his early designs and traced their development step by step to the present three engine transport which has received so much comment recently He compared designs of European countries with those of America and outlined present tendencies that were becoming evident in the way of design and construction and spoke of their probable ultimate outcome. He illustrated his talk with a very complete set of slides, and later showed motion pictures he had taken himself of some of the adventures of the original three-engine plane before Commander Byrd took it to the Pole A few reels of the gliding flight contests in Europe proved very interesting to the members because of participation in the same meets by a glider constructed and flown by the M I T Aero Society Mr Fokker's comments on the behavior of the planes were met with roars of laughter. In fact, his entire talk, though very technical and informative throughout, was also very humorous

The retiring president, Franklin T Kurt, acted as toastmaster, and introduced in turn, Prof E P Warner, in charge of the Aeronautical Engineering course at M I T, Lieut Mark R Woodward, in charge of the R O T C Air Service Unit at M I T., and Lieut. R D Thomas, commander of the U S Naval Reserve Air Station at Squantum, which yearly trains a number of M I T men. These three speakers have aided the society in a number of ways during the past year and their help has been greatly appreciated A telegram from Porter H Adams of the National Aeronautical Association was read, expressing his regards to the meeting and to the continued success of the organization

Preceding Mr. Fokker's talk, Shepherd Dudley entertained with demonstration flights of small models constructed of paper and small strips of bamboo glued together, which are exact scale models of the planes they represent, and, although they are less than eight inches in spread, they fly remarkably well, and perform all of the maneuvers with accuracy and surprising likeness. Mr Dudley launched a small Avro in a circle about the room followed by a PW-8, both models returning to his hand at the same time, without his moving from his seat. To the delight of all the 140 people present, a beautiful three-engine Fokker plane then floated overhead, and, after circling the room, descended gracefully to a perfect three-point landing on the table directly in front of Mr Fokker. Mr Dudley presented the little plane to Mr Fokker as a token of the occasion Later in the evening, after the meeting had adjourned, the PW-8 was put through a stunting exhibition in a larger hall, the little plane looping, rolling, and doing Immelmans in a thoroughly competent manner, making a perfect landing after each flight

Announcement of the election of officers of the society for the coming year was made as follows:—B A. Gilkes, president; B S. Kelsey, vice-president; R. E Manchester, secretary; Erik Hofman, treasurer; members of the Board, E M Lester, J C Redding, and F T Kurt.

R B C Noordnyn, Mr Fokker's American manager and representative, was then asked to draw the names of four members from a hat containing all the member's cards, for the opportunity of free flights over M I T. R. B. Collins, F P Nicholson, Francis McVay, and Manfred Rauscher were the winners. This custom of annual flights to lucky members has existed since the early days of the society, and now, when a large number of the members either fly in the R O T C, the Naval Reserve, or for themselves, the custom is still maintained for the benefit of the non-flying members. A further opportunity is offered to all M I T men for flights at the special rate of four dollars, a special courtesy made to the Aeronautical Engineering Society by the Boston Airport Corporation The flights consist of sight-seeing trips over Boston, around the M I T buildings and back to the Airport in Travel-Air planes.

Notables at N.A.A. Luncb

The April meeting of the District of Columbia Chapter was held at luncheon at the Army and Navy Club. Postmaster General Harry S New, was the guest of honor Mr New mentioned the successful routine operation of the transcontinental air mail airway as a proof in fact that airplanes can be operated on schedule with reliability.

He also spoke with some misgivings of the large number of contract air mail routes that are planned for He fell that it may have been safer to initiate commercially operated airways over a smaller number of routes The measure of success or failure of the commercial airways being inaugurated, however, cannot be predicted, and accordingly it seemed best to err, if at all, toward progress.

Among those present at the luncheon were: Mr Orville Wright; Dr. S. W. Stratton, President of Massachusetts Institute of Technology, Dr. W. F. Durand, member of National Advisory Committee for Aeronautics, Dr Joseph S. Ames, Johns Hopkins University, Admiral Moffett, Chief of Bureau of Aeronautics, Navy Department, Dr G W Lewis, Director, National Advisory Committee for Aeronautics, Lieut Doolittle, holder of the World's seaplane speed record, Wing Commander Heatherington, Air Attaché, British Embassy, Comdr Silvio Scaroni, Air Attaché, Italian Embassy; Carl Fritche, National Air Transportation, Inc., Detroit; Howard F Wehrle, the Sesqui-Centennial, Philadelphia; E P Warner, Massachusetts Institute of Technology; Porter Adams, Boston Airport, J H Wilson, Governor of National Aeronautic Association; Godfrey L Cabot, President, National Aeronautic Association, and other notable figures in the development of aeronautics,—47 in all.

Boy Scouts Will Study Aviation

A meeting held in Central Park, New York City, May 15, marked the first steps in a campaign whose aim it is to interest the Boy Scouts of America in aviation and through them, the American public Manhattan Council, represented by 100 members, was informed of the air education program, which will be undertaken with the help of the American Society for the Promotion of Aviation, Col. Harold E Hartney outlining in his address the purpose of the meeting and the qualifications necessary to entitle a scout to activity in aviation

A course has been planned which will consist of instruction in the principles of flying construction and operation of model toy planes Lieut. Robert S Bowen, a former scout leader and one of the youngest service pilots to fly over the German lines during 1918, will give the course Similar courses will be given in Scout Councils other than Manhattan, it being planned to ultimately include the entire country in the campaign

The American Society for the Promotion of Aviation, 522 Fifth Ave., New York City, will be glad to hear from any man of air training who will he willing to devote one night a month to this work.

Eberhart Organizing Engineering Staff

The Eberhart Aeroplane & Motor Co., Inc., of which Cleburne Eberhart, Jr., is president, is building up a competent aeronautical engineering staff New additions to the Eberhart organization are Sam Irvine, formerly associated with the Cox Klemin Co., who will act as general superintendent; Norman MacQueen, formerly with the Huff-Daland Company and the Fairchild Aircraft Mfg. Co. as engineer and Fred Flader, formerly with the Bahl-Verville Aircraft Company, as chief engineer in charge of aircraft design

Bill Permits Carrying First Class Mail By Air

On May 19, a bill (H.R.11841) to enable the Postmaster General to make contracts for the transmission of mail at fixed rates per pound, was brought up before the House of Representatives and passed. The bill is an amendment to section 4 of the air mail act of Feb 2 and reads as follows:

"That the Postmaster General is authorized to contract with any individual, firm, or corporation for the transportation of air mail by aircraft between such points as he may designate, and to further contract for the transportation by aircraft of first-class mail other than air mail at fixed rates per pound, including equipment, under such rates, rules, and regulations as he may prescribe, not exceeding $3 per pound for air mail for the first 1,000 miles, and not to exceed 30 cents per pound additional for each additional 100 miles or fractional part thereof for routes in excess of 1,000 miles in length, and not exceeding 60 cents per pound for first-class mail other than air mail for the first 1,000 miles, and not to exceed 6 cents per pound additional for each additional 100 miles or fractional part thereof for routes in excess of 1,000 miles in length Existing contracts may be amended by the written consent of the contractor and the Postmaster General to provide for a fixed rate per pound, including equipment, said rate to be determined by multiplying the rate herein above provided by a fraction, the numerator of which is the per cent of revenues derived from air mail to which the contractor was previously entitled under the contract, and the denominator of which is 30"

The primary object of the bill, according to its sponsors, is to simplify the counting of the air mail letters In many instances this delays the mail for nearly an hour Very accurate figures have been made out for the average number of letters to the pound and, if the bill passes, the air mail given to a contractor will be merely weighed and he will be paid per pound instead of by a count of the value of the stamps on each letter. This will make little, if any, difference in the amount received by the contractors but will greatly simplify accounting The feature which is of greatest interest to the air mail contractors is the provision allowing for the carrying of ordinary first class mail if there is room in the plane and the contractor so wishes. The revenue from the first class mail will, of course, not be nearly as high per pound as from the special air mail and it would not pay to carry it alone but, as a filler and especially on the shorter lines, it might bring in a sufficient amount of revenue to warrant its being carried

New Florida Air Mail Schedule

A change in plane schedule on the Florida air mail service (operated by Florida Airways, Inc.) which is expected to more than double the usefulness of the service and to save a full business day on mail to New York and points in the North, has been announced by Postmaster General New

Under the old schedule on which the northbound plane left Miami at 7 a. m., Ft Myers at 9 15 a m and Tampa at 10 20 a. m. the departing time in each instance was too early for the business man to reach without depositing his mail the night before, in which case most of the advantage of the speedier air service over ordinary mail was lost Southbound the new schedule will provide a better local service in Florida. The schedule, which became effective May 27, follows:

South Bound		North Bound	
Leave Jacksonville	1 15 p m	Leave Miami	1 15 p.m.
Leave Tampa	2 20 p.m.	Leave Ft Myers	3 15 p.m.
Leave Ft Myers	4 15 p m	Leave Tampa	4 30 p m
Arrive Miami	8 25 p m	Arriva Jacksonville	6 25 p m

Australian Light Plane Clubs

It is understood that the Australian Government has followed Britain's example in deciding to assist the formation of light airplane clubs and two have been approved for Sydney and Melbourne. The Government will lend two DH Moth airplanes with two spare engines, to each club The Australian Government is also lending its airdromes, free of charge, and is giving a bonus of £20 ($100) to every pupil who qualifies as a pilot.

"Side Slips"

By ROBERT R OSBORN

The reports from John Goldstrom, who is attempting to prove that the world is a still smaller place than most of us thought, are very interesting In endeavoring to complete a trip around the world in thirty-five days, established airplane lines will be used as much as possible, and his reports will probably contain the first authentic complaints about the service, in the history of commercial flying None of the air lines have been operating long enough, so far for the commuters to begin serious complaints and the circulating of petitions asking for better service on the locals Commercial aviation really can't be considered seriously as a competitor of the other means of transportation until excited old ladies are demanding the pilot's name and number, and civic associations are holding meetings to demand that the 5 15 plane be stopped at Hicksville Mr Goldstrom may not get around the world in record breaking time, but he may establish himself permanently in the hearts of the commuting public as the first to tell the conductor that he would get out and walk ahead, waiting for the plane at the next field

* * *

Aviation has been with us long enough that there are comparatively few stunts left for the ambitious adventurer. Among the few "firsts" left is the honor of being the first to be thrown out of an airplane for non-payment of fare.

Most of his plans have not been made public as yet, but we suppose Mr. Goldstrom will follow the example of all foreign travelers by writing extensive articles on conditions in Europe Even at that, probably as much of the world can be seen on a whirlwind trip like this one as could be credited to the average "retired butter and egg man" on the standard thousand dollar, three month tour.

* * *

According to newspaper accounts of it, the fliers for the Stirling Expedition in New Guinea had to return hurriedly from their first exploring trip because of the excited shouting and menacing attitude of the natives when they landed at their first camp. Frankly, we are not acquainted at all with manners and customs in New Guinea, but we offer the suggestion that Professor Stirling, the leader of the expedition, may have misinterpreted conditions altogether The natives indulging in the "excited shouting and menacing attitudes' were probably offering him a ride in the "lowest rate taxicab in town", or possibly he dropped right into the middle of an auction sale of water front lots

Aviation seems to be a fertile field for clever invention and design, and at times progress has been so rapid that really commendable work has failed to get credit. We have in mind a case last year at one of the eastern factories, where a group of airplanes was being turned out for the Navy As is usually the case, the pontoons were running over the weight estimate and the heavy sidewalk which still had to be added was causing a great deal of concern. George Page, who was project engineer on the work, finally solved the difficulty by leaving off the sidewalks altogether and giving away a pair of spiked shoes with each plane The shoes were listed as "useful load" thereby keeping down the "dead load" of the machine

* * *

We mention this incident in order to call it to the attention of the committee in charge of the annual awarding of the Collier trophy.

An acquaintance of ours, who has quite a reputation as an airplane designer and builder, after working many weary hours over the interchangeability of parts in one of his planes, is now relieving his feelings by designing another airplane in which no single part will be interchangeable with any other part He claims to have succeeded in eliminating all interchangeability except in wheels and tires for the landing gear, and expects to have this last problem in the design solved very shortly.

AIRPORTS AND AIRWAYS

N. Y. National Guard Air Meet

On Saturday, June 26, the 27th Division, Air Service, New York National Guard, will hold an air meet at Miller Field, near New Dorp, S. I. Two hundred planes, covering practically every type of aircraft in use today, will take part Army, Navy, Marine Corps, National Guard and civilian aircraft units are cooperating to insure the success of this meet.

The program includes 27 events, the attack on Miller Field by a fleet of "enemy" airplanes and whippet tanks, being the principal feature of the meet. Two hundred planes will take part in the battle. There will be a demonstration of aerial combat by two single-seater pursuit planes, which will attack a two seater observation plane a few hundred feet above the field. Six exhibitions of parachute jumping will be given and 30 planes from Mitchel Field will attend, in addition to a squadron of observation planes from Langley Field, pursuit planes from Selfridge Field, observation planes from Pope Field, bombing planes from Aberdeen, experimental planes from McCook Field, bombing and observation planes from Quantico and naval and seaplanes, flying boats and bombers from Anacostia will attend.

The National Guard Air Service units in Connecticut, Pennsylvania and Massachusetts will send planes to the Field. The Naval Reserve air fleet will be represented by five or more planes.

In arranging for the meet, Maj. George A. Vaughn, Jr., has been assisted by Capts. George Usher, G. Wheeler, L. C. Brower and von Lockum, Lieuts. E. J. T. Weatherdon, L. F. Long, J. M. Noble, W. G. Rector, J. B. Morris, A. W. Snowden and the enlisted personnel of the 27th Division Air Service, New York National Guard.

The program of the meet is as follows:

1. On to Miller Field—Open to all types of planes
   (a) To organization sending greatest number of planes—1st prize—silver loving cup.
   (b) To field flying greatest number of airplane miles. 1st prize—silver loving cup.
2. Formation flight—1st heat—11 00 a. m. open. 1st and 2nd prizes—silver cups
3. Landing to a mark—11 40 a. m. open. 1st prize—gold watch—2nd prize—silver cigarette case 3rd prize—set of military brushes
4. Altitude race—12 00 n. open—prizes the same
5. The Blue Ribbon airplane—12 30 p. m. open. mechanics sweepstakes for best condition airplane. 1st prize gold cuff links—for each of winning ships crew
6. Seaplane race—1 p. m. open—Miller Field to Statue of Liberty and return. Prizes same as for event No. 3
7. Parachute jumping—1st heat 1 15 p. m. Prizes same as above
8. Battle between airplanes and tanks. (Demonstration) Attacking tanks bombed by airplanes
9. D H. speed race 1 70 p. m. open only to U. S. Army regulation D. H. planes. Start and finish over field. Prizes same as for event No. 3
10. Stunt flying—1st heat 1 40 p. m. open. Judged as variety of stunts and skill manoeuvering. Prizes same as event No. 3
11. Sky Writing (Demonstration) 2 00 p. m.
12. Formation flight 2 15 p. m. 2nd heat
13. Aerial combat (demonstration) 2 30 p. m. Two seater attacked by two Scout planes. Observer will jump from two seater
14. Stunt flying—2nd heat 2 45 p. m.
15. National Guard speed race—3 p. m. Limited to National Guard Squadron only. Prizes same as event No. 3
16. Parachute jumping 2nd heat 3 30 p. m.
17. Stunt flying 3rd heat 3 45 p. m.
18. Formation flight 3rd heat 4 00 p. m.
19. Smoke screen laying (demonstration) 4 00 p. m.
20. Parachute jump 3rd heat 4 15 p. m.
21. Open speed race—4 30 p. m. start and finish over field. Prizes same as event No. 3
22. Stunt flying—4th heat—5 p. m.
23. Speed race—5 00 p. m. Open to all planes rated under 150 miles per hour. Start and finish over field
24. Parachute jump—5 15 p. m. 4th heat
25. Relay race, mixed types—5 30 p. m. Three planes to a team. First prize three gold watches
26. Stunt flying—5 30 p. m. 5th heat
27. Parachute jumping—6 00 p. m. 6th heat

Balloon bursting exhibitions throughout course of meet.
Announcements of events and winners by loud speakers on field.

Rochester, N. Y.

By M. B. Seeles

A plan is in preparation for approval of the Rochester Common Council whereby Rochester will have a completely equipped airport in Britton Field without any expenditure of taxpayers' money. Harold W. Baker, commissioner of public works, says that plans allowing a private firm to build hangars and equip Britton field will be ready for submission to the Common Council at its next meeting.

The firm would equip the field to the satisfaction of city and air mail officials, Mr. Baker says, for the privilege of the oil and gasoline concession on the field. No expenditure is necessary for drainage, he says, as the field is now in good condition. Competent field markers are now ready to mark the field.

Officials of Erie, Pa., are preparing to cooperate in the movement for establishment of an air mail route between Rochester and Cleveland by allowing Rochester fliers the use of their field as a station.

Britton field is now being used by the McDermott-Talaska Aircraft corporation, of which Thomas McDermott is president. The company maintains a fleet of four airplanes for passenger flying, two of which are new Curtiss Orioles. Instructors will also teach the art of flying. Crowds motor to the field from the city and neighboring towns every Sunday and all planes are busy from morning until far into the evening taking people for flights. The company last week conducted a successful air mail test flight between Rochester and Cleveland, in the interest of bringing an air mail route to Rochester.

Hartford Airport, Conn.

By Ethel M. Reerden

Connecticut is rapidly showing its increasing interest in aviation.

The Connecticut Chamber of Commerce has organized an Aviation Commission with the following membership:

Chairman E. G. Buckland, Vice-President the New York, New Haven & Hartford Railroad Company; Edward N. Allen, Vice-President Sage-Allen & Company, Hartford; Joseph W. Alsop, Public Utilities Commissioner; William BreSmith, Vice-President, Travelers Insurance Company; C. L. Campbell, Treas. Connecticut Light & Power Company, Waterbury; Porter B. Chase, Pres. Bankers Trust Co., Hartford; Robert Fuller, Asst. Treas. Connecticut Mutual Life Ins. Co., Hfd.; George L. Fermee, Beach-Fermon & Company, Hfd.; Major Talbot O. Freeman, Chief Aviation Inspector for Connecticut, Hartford; Phillip R. Gole, Pres. Hartford Machine Screw Company, Hartford; J. Henry Kornbeck, Vice-Pres. Connecticut Light & Power Company, Hartford; Major H. H. Skarrell, Manager, Packard Motor Car Company, Hartford; James R. Silliman, Sec., Aetna Life Insurance Company, Hartford; Ernest C. Wilcox, Pres., Connecticut Telephone & Electric Company, Meriden.

The purpose of this Commission is to be to aid the development of commercial aviation throughout the State.

Another commercial corporation has been added to the list for Connecticut, this being The Nutmeg Flying Corporation, with a membership of:

Oscar F. Kraus, President; Leo Kraus, Secretary; John M. Ludik, Vice-President and Manager.

This company expects to maintain headquarters at the Hartford Flying Field for the present and are to be distributors of Swallow airplanes in this vicinity.

Mr. Ludik is a well-known experienced pilot and the company is fully equipped to handle all commercial propositions.

Now that the waters of the Connecticut River have fully decided it is impossible to compete with the progress of aviation, full activity has commenced at the field and an Army

TW3, piloted by Harry Depew Copland gave way to a minature race with a Waco, piloted by P. H. Spencer. The latter outmaneuvered the former and thus the first burst of excitement put pep into other pilots and mechanics who are rushing their overhauling jobs to get onto the field line again.

We expect soon to see the arrival of a Travel Air and with the representation of this plane, the Swallow and the Waco, together with the other individually owned commercial ships, there promises to be interesting development from now on.

Monmouth, Ill.

By Ralph B. Eckley

The Midwest Airways Corporation has purchased the hangar used by the Development Division of the Air Mail Service, which was located at Monmouth Field. The local company has taken possession of the hangar, and has moved operating headquarters into the new structure. The additional building gives the field ample hangar facilities for eight planes.

During the past four months, the Midwest Airways Corporation has received and delivered eleven new Waco airplanes. Keen interest has been shown by commercial pilots throughout the state in the wonderful performance of the Waco, which has been demonstrated in this section by Pilot John H. Livingston. Four used ships have also been sold and prospects seem excellent for continued heavy sales.

Sales of Waco airplanes have not been confined to commercial pilots alone, but many business men and manufacturing concerns are investigating and buying ships of this type for their personal and business uses, which tends to show that aviation is continuing to advance further into the public's mind.

Dycer Airport

Dycer Airport, one of the most attractive landing fields in Southern California, is located Southwest of Los Angeles, 9 miles from the center of the city and bordering its main highways, 5 miles from the Pacific Ocean and 50 ft. above sea level. The airport is one-half mile square, with a 60 ft. line on the eastern border, 6 in. drainage ditches on the North and South borders and emergency fields in all directions. A hold hunting and a repair shop, 40 ft. by 18 ft., with a pilot in charge at all times, are maintained and repair and fuel facilities are available at all times.

Three new planes, for use in the airport, are now in course of construction, a JN4-D, a J1 Standard and a two-

Dycer Airport, Los Angeles, Calif.

place OX5 sport plane. Charles F. Dycer is owner and proprietor of the Airport and John S. Hubin, Roy Payne and Edward A. Dycer are the pilots.

Garden City, L. I.

Considerable excitement was afforded at the field when Paul Braid lost half of his landing gear on the take off. J. P.

Andrews in a Standard and Ireland in his Meteor hopped off in pursuit and finally caught up to Boyd. As soon as he saw a wheel being waved at him Boyd realized what the trouble was and headed for Long Island Sound, with the intention of landing in the water. Andrews objected to the loss of the plane and tried to persuade Boyd back to the field. As neither knew the sign language it took some time to get the idea across but Andrews used cowboy methods and by diving under and in front of the one-wheeled plane he finally herded it back to Mitchel Field. The ambulance and fire engine were on the spot but Boyd fooled them all by making a perfect landing and practically no damage was done to the plane. After the temporary repairs had been made to the landing gear, the plane was towed back to Curtiss Field. This is the second one-wheel landing which has taken place at Mitchel field within the year and the fourth or fifth on record during the same period, where neither the plane nor pilot were injured. It would, therefore, seem as if it were better, after losing a wheel, to land where there is assistance handy in case of trouble than to fly for water where damage is certain.

Ireland has sold his Meteor plane to H. C. Doyle but performance tests are continuing and the plane shows most interesting results. Ireland has started building several more. Doyle who is connected with the Sleeper Radio Corp. is an old time pilot and is flying for pleasure.

Pilot Smith flying a Fokker for the Bock Camera Corp. of Philadelphia was a recent visitor at the field.

Art Caperton is off to Boston in the Fairchild Fokker to do some camera work. J. P. "Andy" Andrews expects to go to Cape Cod shortly to do some dusting.

The Curtiss hangar has been presented with a radio set by A. H. Grebe and Co. through the courtesy of Jack Shaunessey. The radio is for the purpose of getting weather reports and seems to be used continuously, filling the hangar with a cheery sound.

The Curtiss Aeroplane and Motor Co. recently gave a dinner and dance in honor of E. S. Jenkins who is going to Buffalo to take charge of pursuit orders. A good time was had by all.

The Pioneer "Flying Instrument Board" is visiting the field. To be more literal, there is a very nice Travel Air built around the two instrument boards. The plane has been used as a laboratory and also as a demonstration machine to show the advantages of the various instruments.

Gareth Clarke, a recent graduate of the Curtiss school, has flown his Jenny to Rochester. Two forced landings were successfully negotiated on the way up but nothing broke. It is reported that Clarke is doing so well carrying passengers that he is coming back after an Ireland Comet.

Warren J. White, our erstwhile correspondent, is going to Yucatan on an exploration trip but not via the air route.

Cleveland News

By W. T. Whitlock

With the coming of warm weather, the airport is gradually waking from its long winter somnolence. May 18 marked the date of the first actual steps in the coming season. The Willard Parker Fliers, who have been Cleveland's main source of civilian aviation for the past three years are moving their base from the city office to the airport and will maintain their headquarters there. Parker reports that flying activities will start immediately after their "house-warming". Sixty students have signed up for a course this Summer and in student work alone, the organization will be kept busy. In the school equipment there are two Jennies, a Canuck, a K6 Standard, a DeH6, a Thomas-Morse OXX6 and a small parasol mono which is to be used for advertising purposes. It is the company's policy to instruct the knowledge seeking public, and inquisitive onlookers will not be shooed away from the planes but will be permitted to become acquainted with the various operations of an airplane, which, to my mind is an excellent plan.

Incidentally, Parker was instrumental in the forming of a new aviation club in our fair city. The Aero Club of Cleveland was recently organized, and to date has fifty five members on its roster. The main purpose of the club is to educate aeronautically the uninitiated, and in general, promote civilian aviation. Parker was elected president and

C. W. March, director of operations. A drive is to be made shortly to increase the membership to five thousand, which, from reports made by club officials will not be difficult. Club members will not only become theoretically acquainted with flying, but cross country flights are planned for the summer and each pilot will take with him a fellow member of the club. The first activity of the Aero Club is the planning of an Air Meet to be held at Brook Park on May 30. The program is as yet nebulous, but stunt flying, races, balloon bursting and the usual air meet feats are assured. It will be the first meet of the year and let us hope that it will be a success.

A new Waco was delivered last week to the Sanborn Aviation Co., which has its headquarters in Willoughby, by Paul Riddle of Cincinnati, who has the Waco Company agency for Ohio and Kentucky.

A trial trip was made from Rochester, N. Y., to Cleveland recently by way of Buffalo and Erie. Pilot Enderton of Rochester made a trip in a Curtiss Oriole.

By-the-way, Marvin T. Mokah of West Wallop, who has been having so much trouble with his non-stall engine, reports that he, as yet, has been unable to stop the Gnome, and is fearful of consequences should no one send in any practical suggestions. He is endeavoring to ascertain the cause of the engine's coolness and, should he hit upon the source, will let it run its course and patent the cooling device. Mokah expresses a regret that a prop was not attached during this warm weather, so that he could in some way benefit by its obstinacy.

Louisville, Ky.

By H. Fitzgerald

The running of the Kentucky Derby is annually witnessed by more than 50,000 persons and each year finds an increasing number of visitors arriving by air. On May 14 and 15 between 35 or 40 planes swooped down on Bowman Field, but the 465th Pursuit Group Air Service Reserve, which is located here, had plenty of men in hand to care for the visitors.

In numbers the Army Air Service came first, with about 25 planes of different types, but commercial aviation was well represented by the following: 2 new Wacos, belonging to the Embry-Riddle Co., of Luken Airport, Cincinnati, 1 new Waco of the Nashville Aeronautical Association, Nashville, Tenn.; 1 Jenny from the Eaton Airplane Co., of Cincinnati, 1 T M, with OX5 engine, from the Steckhan Motor Sales Co., of Chicago, and 1 Oriole, belonging to the Fox News Reel Co. The Tennessee National Guard was also represented by three planes.

Everyone who saw the new Wacos perform were enthusiastic about them and all agreed they were the best OX5 jobs ever seen for the money.

Chicago, Ill.

By Otto Klein

It seems that aerial advertising, when conducted in the right way, is still as popular as ever. In celebration of the opening of the new Spiegel furniture store at 79th Street and Halsted, the Chicago Aeronautical Service flew over the district, dropping colored darts, many of which were exchangeable for valuable prizes. The ship flying real low over the neighborhood did not fail to attract the attention of thousands, and the streets were jammed with children and grown-ups scrambling for the fluttering papers. The prizes ran to one hundred dollars as well as valuable merchandise. Due to the aerial advertising, the Spiegel store enjoyed a far greater attendance than any other store that ever had an opening celebration in that neighborhood.

Elmer Partridge has finished his Whirlwind cabin job and test flew it last week. It is said that the performance turned out to be something quite remarkable.

Francis Schaffner, who learned to fly with the Heath Airplane Company recently, has flown his Canuck to Indianapolis, and from there through Indiana on a barnstorming trip. He had several forced landings on the way, but made it all right.

Seignius & Seignius, local real estate dealers, have recently added a beautiful C-6 Standard to their equipment. They intend using airplanes to take their prospects over their new lake shore subdivision, some hundred miles north of Chicago. Charles Seignius and his younger brother, Whitford, both holders of F.A.I. certificates, will fly the ships.

U. S. Air Forces

Bombing Competition at Langley Field

The third annual Aerial Machine Gun and Bombing Competition, which began at Langley Field, Va., May 5, was completed May 15, with the exception of the lighter-than-air bombing, which was the last event of the competition.

Teams were entered in the competition from every tactical squadron in the country and in addition there were three teams from the Canal Zone, five teams from the U.S. Marine Corps at Quantico, Va., and three National Guard teams from Washington, Colorado and Alabama, respectively.

The matches were conducted under practically the same rules as the 1925 matches, and consisted of the following events: Event I—Machine Gun firing with fixed guns at ground targets, Event II—Machine gun firing with flexible guns at ground targets, Event III—Machine gun firing with fixed guns at tow target, Event IV—Machine gun firing with flexible guns at tow target; Event V—Low Altitude bombing, 300 ft. minimum; Event VI—Intermediate altitude bombing, minimum altitude 5,000 ft.; Event VII—High altitude bombing, minimum altitude 8,000 ft.; Event VIII—lighter-than-air bombing, minimum altitude 3,000 ft.

The presence of the Marine Corps contestants provided an added meantive to the Army pilots to do their utmost, and as a result the competition was keen throughout the matches. The Marines were out to show the Army who were the best shots, and they did some remarkable shooting. First Lieut. L. H. Sanderson, U.S. Marine Corps, who competed as a pursuit pilot, gave the Army flyers a mark to shoot at with a total score of 706, which looked good for first place in events I, III and V. The Army, however, had an "ace in the hole" in 2nd Lieut. L. M. Merrick who, although handicapped by a penalty of 36 points and with 14 shots still to fire, came through in fine shape with a score of 730, including his low altitude score. This assured the Army of first place in the pursuit events.

The observation and attack pilots match was a race between 2nd Lieut. E. E. Partridge and H. S. Vandenburg, both from the 2nd Attack Group, Kelly Field, Texas. Lieutenant Partridge finally nosed out his competitor, running a score of 646 to Lieutenant Vandenburg's 638. First Lieut. R. N. Ott added to the Canal Zone's laurels by running third in this match with a score of 537.

The observers match, flexible guns on ground targets and on tow targets resulted in a run for 2nd Lieut. H. C. King, A.S., of Mitchel Field, L.I., with a score of 197. Capt. R. J. Archibald, U.S. M.C., who looked like the winner at first, was second in this match with a score of 190. Third place went to 2nd Lieut. C. W. Cousland, A.S., of Post Field, Fort Sill, Okla., with a score of 168.

In the intermediate and high altitude bombing it looked after the first event, bombing at 5,000 ft., as if Lieutenants McReynolds and Lindebnrg of the 2nd Bombardment Group would walk off with the honors, as their score was better than any of the other competitors, but Lieutenants George and Harmon, of the Office Chief of Air Service, went after the

target from 6,000 ft. and made a score of 1472, or 92%, to win the match. Lieuts. W. T. Larson and C. E. Shankle, of Panama, were second with a score of 1334.

The lighter-than-air bombing competition is still in progress at this writing and will be completed about May 18, weather permitting. Five officers are competing in this event.

Weather conditions were generally excellent throughout the period of the competition. Morale was high among the contestants, and as a result there was plenty of spirit and competition displayed. There were no accidents except one or two of a very minor nature. The equipment brought to Langley Field by the contestants was in generally good condition. A large number of Douglas O-2's were used during the competition and gave excellent service throughout.

National Guard Air Flights

Maj. Gen. Creed C. Hammond, Chief of the Militia Bureau, has granted general permission to the State Adjutants General to approve requests and to authorize cross-country flights of the National Guard Air Service squadrons. Officers on such trips will not be on travel status and claims for damages arising from such flights cannot be considered as claims against the United States.

New Commandant of A.S. Tactical School

Maj. Frederick L. Martin, Air Service, has been designated as commandant of the Air Service Tactical School at Langley Field, Va., to take effect Sept. 25, 1926. He relieves the present incumbent, Maj. Oscar Westover, who has been ordered to report at this school for duty as a student in the course beginning Sept. 27, next.

Other Air Service officers ordered to Langley Field for duty as students at the Technical School are Mnjs. Ira A. Rader, Eugene A. Lohman, Ralph Royce, Capts. Robert C. Candee and Charles B. B. Bubb.

Rockaway Air Station

Assistant Secretary of the Navy, Douglas Robinson, accompanied by Admiral Charles P. Plunkett and Lieut. Commander Pownall, inspected Jacob Riis Park at Rockaway Point on May 20.

The Government wants this property for a naval air station. The grounds were used during the war, but reverted to the city about four years ago. During the past week Lieuts. C. M. Johnson and H. S. Kendall have been in charge there with a detail of twelve men.

Mr. Robinson said he considered the property the ideal location for an air station in the New York district. He said he hoped that fifty-three acres of the land could be obtained for the establishment of a station with the most modern and complete equipment. There are still some hangars on the grounds, although they are in need of extensive repairs.

Plans for Carriers

With the completion of the two new aircraft carriers, Lexington and Saratoga, which is expected on July 1, 1927, each major division of the United States Naval Fleet will be provided with an air force, according to an announcement from the Navy Department on April 30.

The full text of announcement follows:

The Lexington, which will be commanded by Capt. Walter R. Gherardi, will be assigned as flagship of the Aircraft Squadrons of the Scouting Fleet. The Saratoga, which will be commanded by Capt. Henry V. Butler, will be the flagship of the Aircraft Squadrons of the Battle Fleet. One of the newest aircraft carriers will be stationed on the Atlantic coast and one on the Pacific coast. The Saratoga will be completed first, about Dec. 1, 1926. The Lexington will be completed about April 1, 1927. Both ships will go on a shake-down cruise and acceptance trials before joining their respective stations.

Army Air Orders

Capt. Henry Irving Brock, A.S. Res., New York, to active duty, Washington, reverting to inactive status June 20.

First Lieut. Roland Birnn, A.S., Kelly Field to Mitchel Field.

First Lieut. John F. Whitely, A.S., McCook Field, to Kelly Field.

First Lieut. Alfred I. Purvear, A.S., Langley Field, to Scott Field.

First Lieut. Park Holland, A.S., relieved from assignment and duty, Kelly Field, and will report to commandant at that station for assignment.

First Lieut. Paul Evert, A.S., Chanute Field, to Langley Field.

Sec. Lieut. John P. Kidwell, A.S. (Inf.), Kelly Field, to Scott Field.

Transfer of Sec. Lieut. Raymond Miller Barton, A.S., to Cav., announced. Lieut. Barton is relieved from duty at Fort Sam Houston and is assigned to 2nd Cav., Fort Riley.

Capt. Calvin E. Giffin, A.S., Rockwell Field, to San Francisco, reporting to com. off. Letterman Gen. Hosp. for observation and treatment.

Capt. Edmund W. Hill, A.S., Scott Field, to Fort Monroe.

Maj. Henry W. Harms, A.S., Langley Field, to Washington.

Capt. Early E. W. Duncan, A.S., Langley Field, to Fort Riley.

Maj. Frank M. Andrews, A.S., designated commandant of A.S. Adv. Flying Sch., Kelly Field.

Lieut. Col. Clarence C. Culver, A.S., to report to commandant A.S. Adv. Flying Sch., Kelly Field, for duty as student, and upon completion of this duty will resume present duties as commandant relieving Maj. Frank M. Andrews, A.S.

Navy Air Orders

Lieut. Raymond E. Farnsworth det. VO Sqdn. 1 (U.S.S. Colorado), Airef. Sqdns., Battle Flt., to Naval Acad.

Lieut. Julian B. Boble det. Nav. A. Sta., Pensacola, to Naval Acad.

Lieut. William K. Patterson det. Airef. Sqdns., Sctg. Flt., to Naval Acad.

Ens. Charles B. Cross det. Nav. A. Sta., Pensacola, to Asiatic Station.

Ens. William V. Deutermann det. Nav. A. Sta., Pensacola, to U.S.S. Arizona.

Ens. Hallsted L. Hopping det. U.S.S. Richmond to temp. duty Nav. A. Sta., Pensacola.

Ens. Frank C. Lavne det. Nav. A. Sta., Pensacola, to U.S.S. Colorado.

Ens. Arthur B. Leverett det. Nav. A. Sta., Pensacola, to U.S.S. Sapelo.

Ens. Solomon F. Oden det. Nav. A. Sta., Pensacola, to U.S.S. Galveston.

Ens. Charles W. Wilkins det. Nav. A. Sta., Pensacola, to U.S.S. Patoka.

Lieut. (jg.) Myron F. Eddy det. Airef. Sqdns., Sctg. Flt., to Naval Acad.

Lieut. (jg.) Arnold J. Isbell det. VO Sqdn. 1 (U.S.S. Tennessee) Airef. Sqdns., Battle Flt., to Naval Acad.

Lieut. Joseph T. Talbert det. Nav. A. Sta., Pensacola, to Naval Acad.

Lieut. (jg.) Edward B. Curtis det. U.S.S. Worden to temp. duty Nav. A. Sta., Pensacola.

Ens. Philip R. Coffin det. U.S.S. Utah to temp. duty Nav. A. Sta., Pensacola.

Ens. John C. Waldron det. U.S.S. Seattle, to temp. duty Nav. A. Sta., Pensacola.

Lieut. Ernest C. Johnson to Nav. A. Sta., Lakehurst, uncompleted portion orders Jan. 12 revoked.

Lieut. (jg.) Russell H. Sullivan to Nav. A. Sta., San Diego, desp. or Apr. 28 modified.

Marine Corps Air Orders

Capt. R. A. Presley det. N.A.S., San Diego, to 1st Brig., Haiti.

Capt. L. M. Bourne, jr., det. A. Ser. Tact. Sch., Langley Field, to Quantico.

Capt. J. F. Moriarty det. A. Ser. Tech. Sch., Chanute Field, to Quantico.

First Lieut. F. O. Rogers det. A. Ser. Tact. Sch., Langley Field, to Quantico.

Sec. Lieut. L. B. det. M.B., N.A.S., Pensacola, to M.B., Pearl Harbor.

Where to Fly

CALIFORNIA

THE RYAN SCHOOL OF AVIATION
O B STAR ROUTE SAN DIEGO
Ideal flying weather all Seasons Very best of planes and instructors Opportunity to study latest planes and construction.
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During the month of April 1925 the advertising agency sent a questionnaire to 1613 names on this list. A summary of the replies shows that

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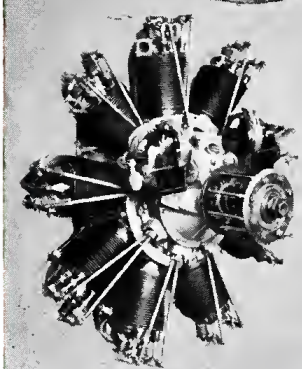

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